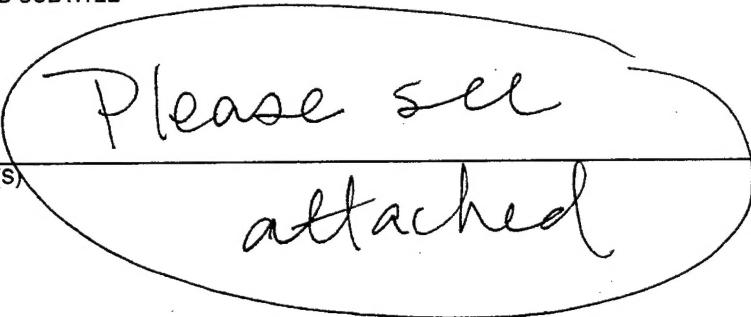


REPORT DOCUMENTATION PAGE

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DTS ✓

MEMORANDUM FOR PRS (In-House Publication)

FROM: PROI (STINFO)

10118046

22 March 2002

SUBJECT: Authorization for Release of Technical Information, Control Number: AFRL-PR-ED-VG-2002-067
55449 T.W. Hawkins (PRSP), "HEDM Monopropellant Development"

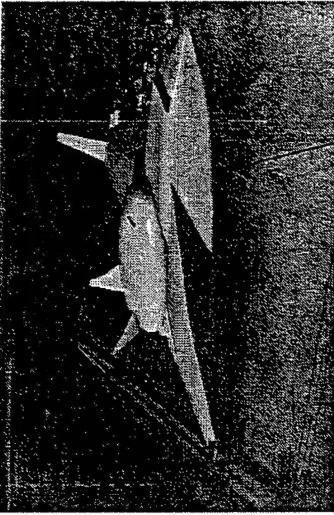
Chief Scientist Tour
(Edwards AFB, CA, 07 March 2002) (Deadline: Past Due)

(Statement A)

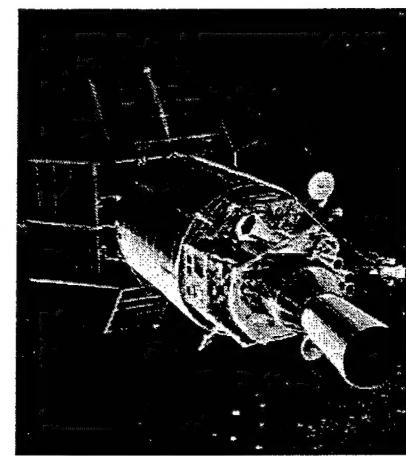


HEDM- Advanced Monopropellants

Monopropellant Development
for Next-Generation
IHPRPT Thruster

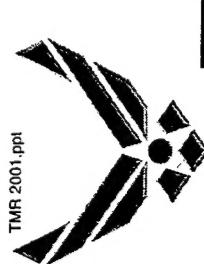


Monopropellant Feasibility for
Emergency Power Units
(F-16/U-2 SPOs)



Advanced Monopropellant for
Large Engines
(NASA MSFC)

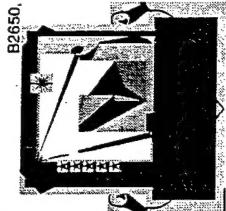
HEDM 6.2 Projects



TMR 2001.ppt

AF-M315 in Next Generation Spacecraft Thruster

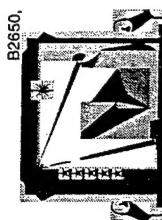
- Advanced thruster for monopropellant (AF-M315)



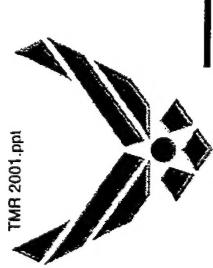
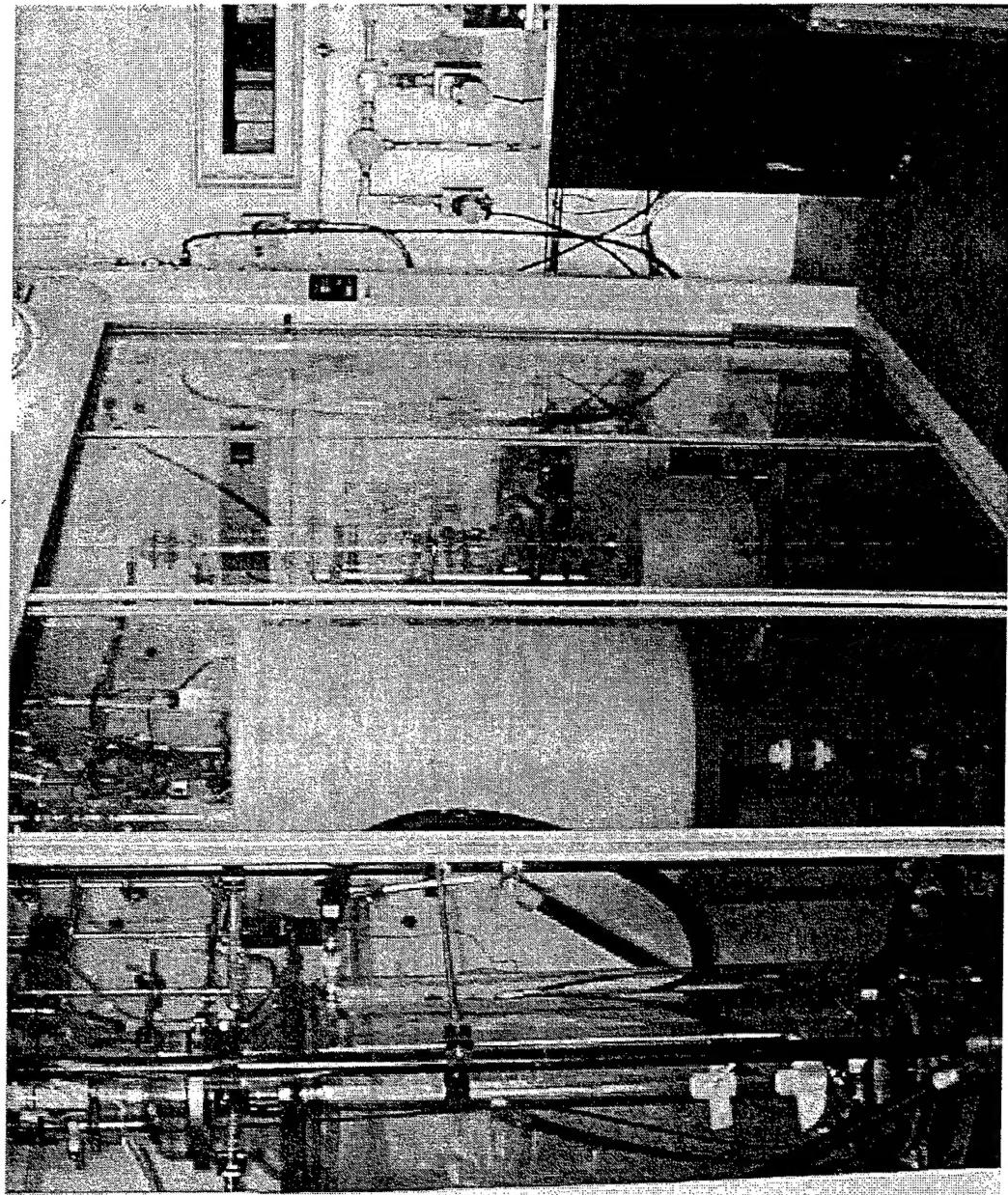
First USAF monopropellant accepted into CPIA Liquid Propulsion Manual

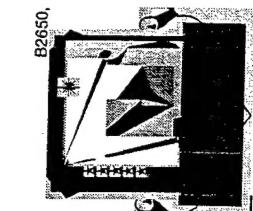
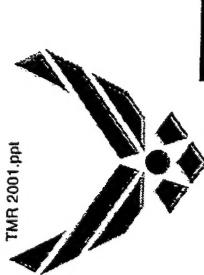
High Performance Capability!

- Propellant downselected for Advanced Thruster Program



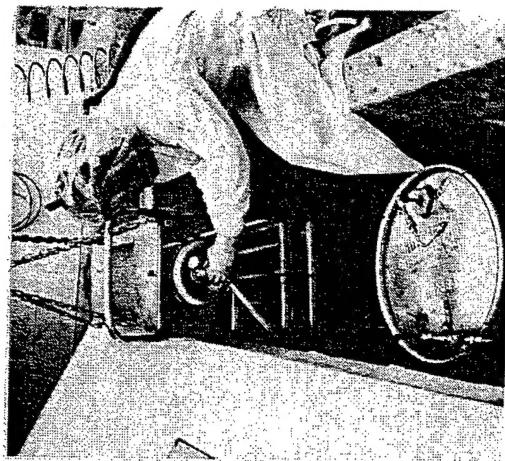
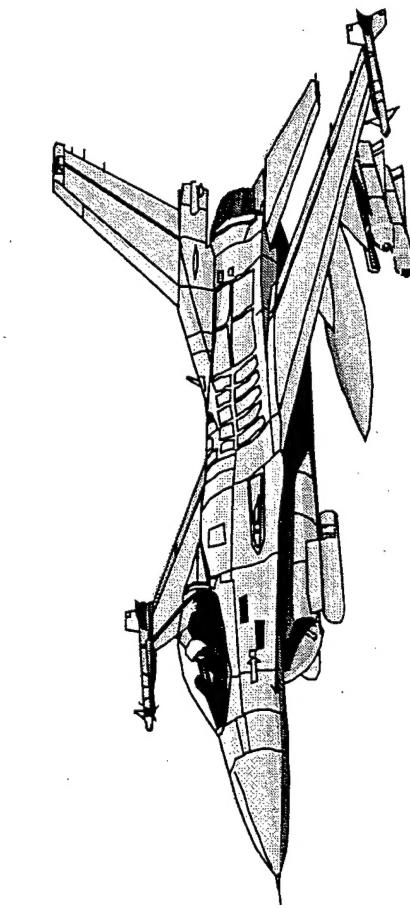
**Grand Opening of
the Area 1-30 Pilot Facility at Test Cell 27
March 4, 2002**





EPU Feasibility Assessment

Can IHPPT Monopropellant Approaches be Modified for EPUs?

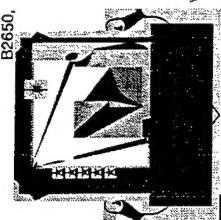


Chronology

- F-16 and U-2 SPOs direction for program proposal (2000)
- F-16 (ASC/TPV) and U-2 (YPV/RAE) SPOs proposal approval for limited feasibility program (2QFY2001)

Payoff

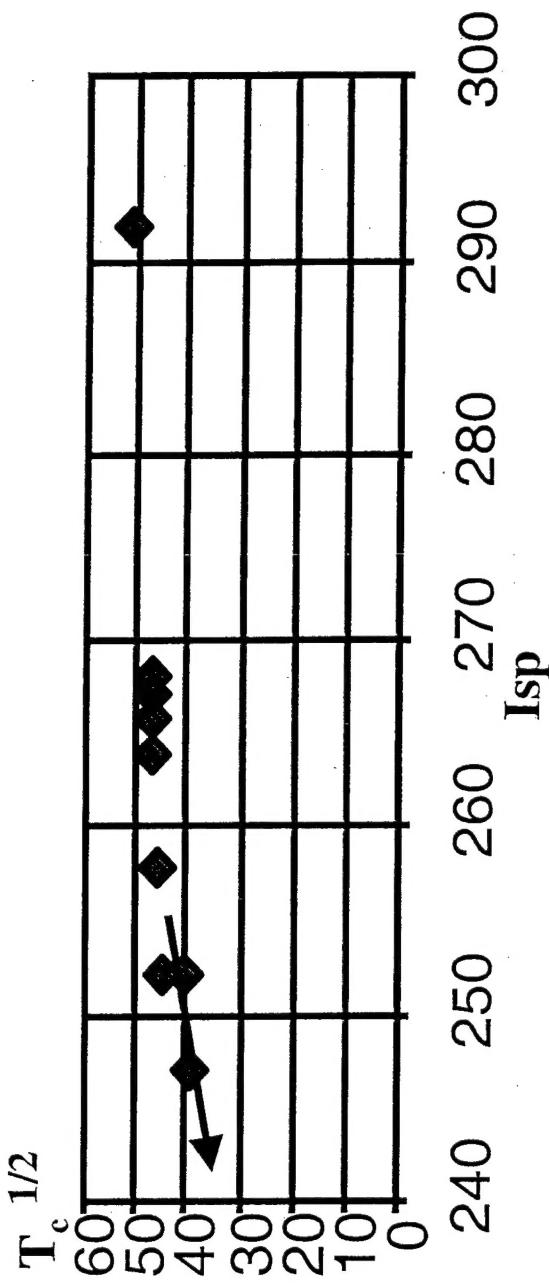
- Eliminate heavily regulated fuel
- Cut base/depot surveillance costs for F-16 and U-2

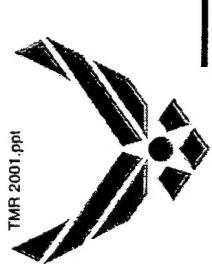


EPU Feasibility Assessment -Project Objectives-

Reformulate Propellants

- Determine composition options
(ODE-type computation)
- Lower performance/combustion
temperature (compatible with Shell
405 catalyst)



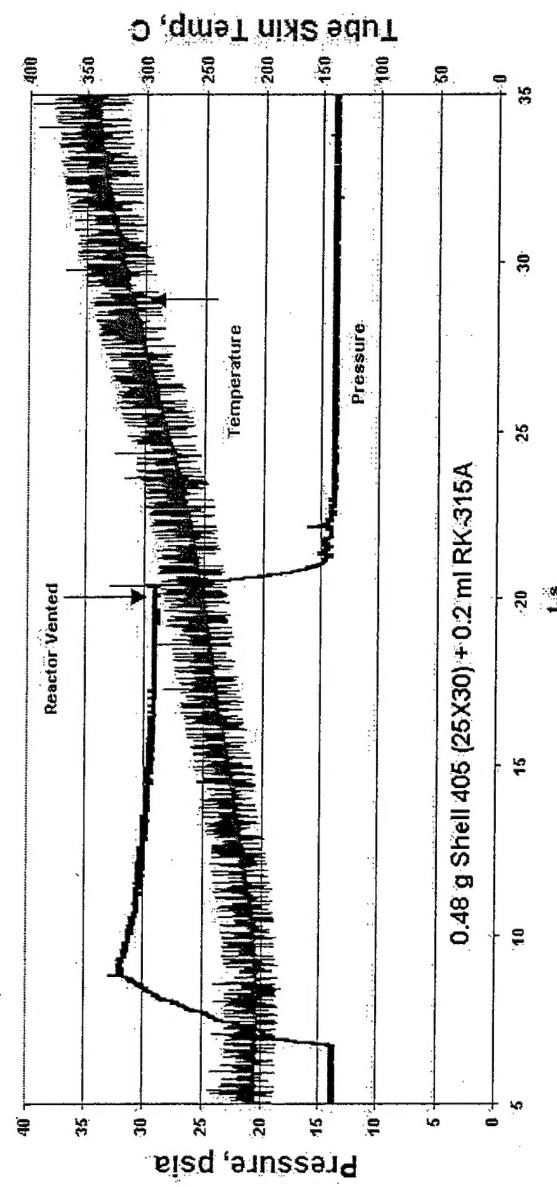
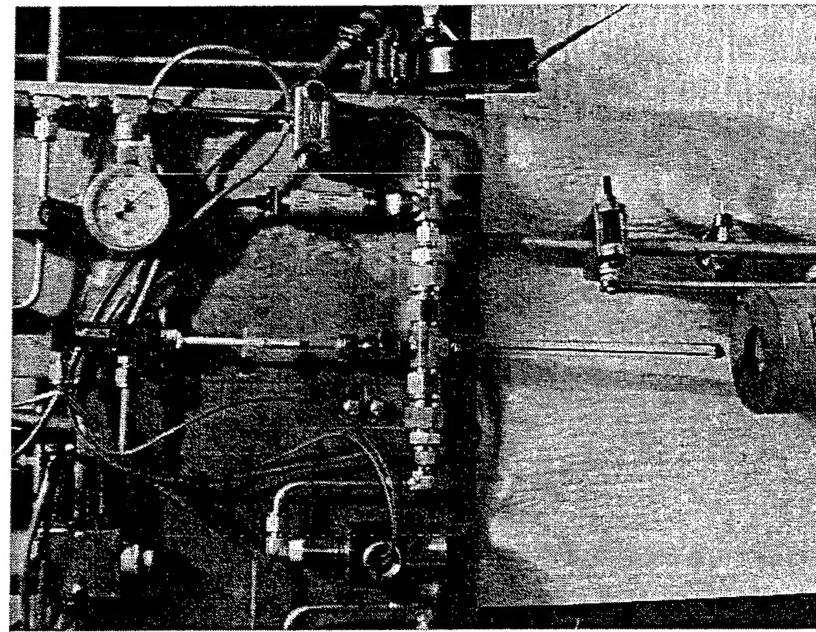


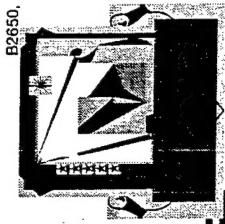
TMR 2001.ppt

Propellant Ignition Assessment

AFRL Pino Test

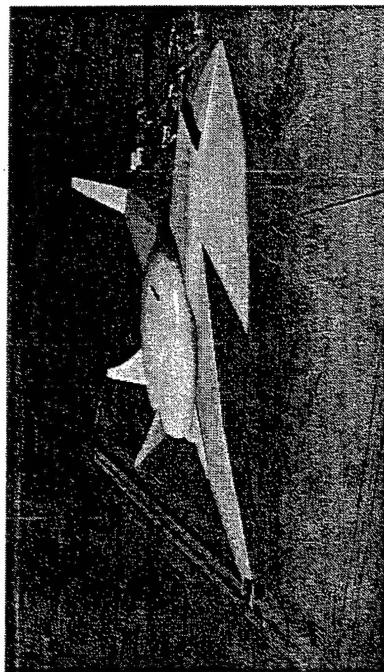
- Adjustable bed temperature
- Variable pressure capability





Advanced Monopropellant for Large Launch Vehicles

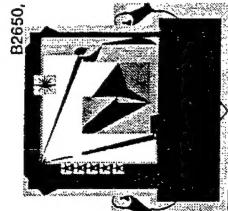
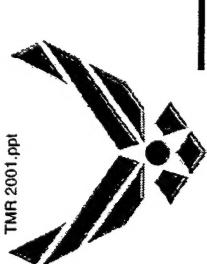
Can IHPRPT monopropellant be modified for large launch engines?



Chronology

- NASA-MSFC requests proposal for feasibility project (4QFY2000)
- AFRL/PRSP submits proposal (1QFY2001)
- NASA-MSFC approves/funds (3QFY2001)
- Single propellant for entire vehicle
 - Eliminate cryogenic fuels
 - Eliminate one pumping system

Payoff



Project Objectives

I. Determine necessary monopropellant characteristics

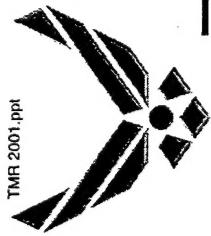
- Identify required performance, safety, hazard, physicochemical properties

II. Determine monopropellant options

- Focus on new monopropellant class

III. Produce/Characterize a propellant candidate (ca. 50 gram-scale)

- safety/hazards properties/ignition
- physicochemical properties (density, rheology, freezing point...)

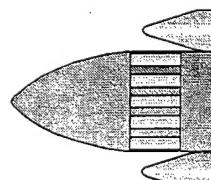


Vehicle System Comparison / Summary

STS (Space Shuttle)

35 Klbm to ISS

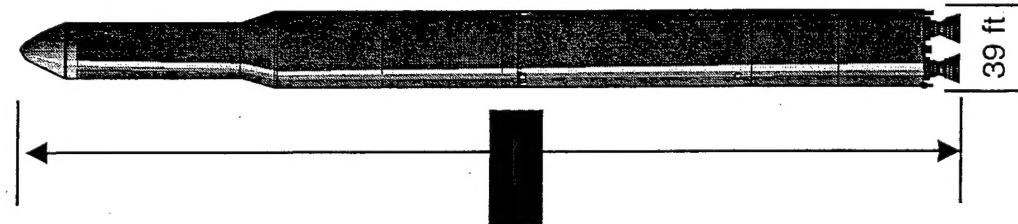
Pressure Feed
35 Klbm to ISS
Glow = 14.7 Mlb



78.5 ft

39 ft

Pump Feed
36 Klbm to ISS
Glow = 5.6 Mlb



29 ft

Pump Feed
High Performance Prop
35.5 Klbm to ISS
Glow = 2 Mlb



20 ft